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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/448,679	11/24/1999	CHRISTOPHER J. LORD	INTL-0252-US	5314

7590 06/17/2004

TIMOTHY N TROP
PRUNER HU AND MILES PC
8554 KATY FREEWAY STE 100
HOUSTON, TX 77024

EXAMINER	
TRAN, TRANG U	

ART UNIT	PAPER NUMBER
2614	

DATE MAILED: 06/17/2004

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/448,679
Filing Date: November 24, 1999
Appellant(s): LORD ET AL.

Mark J. Rozman
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 02, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-33 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,353,059 ***Lawlor et al*** ***10/04/1994***

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-11, 13-14 and 16-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Lawlor et al. (US Patent No. 5,353,059).

In considering claim 1, Lawlor et al. discloses all the claimed subject matter, note 1) the claimed receiving a video frame is met by input data element (Fig. 11, col. 13, lines 36-56), 2) the claimed identifying noise in a first portion of the video frame is met by the threshold measurement and error flag analysis unit 640 (Figs. 11 and 15, col. 13, line 57 to col. 14, line 24), and 3) the claimed replacing the first portion with a second portion of the video frame is met by the spatial replacement which involves replacing a corrupted data element by a single one of the surrounding elements selected according to a predetermined order of priority (Figs. 13-15, col. 15, line 4 to col. 17, line 21).

In considering claim 2, the claimed wherein identifying further comprises: associating a noise level with the first portion of the video frame is met by three checks for the corrupted data element (Fig. 8, col. 12, lines 44-64), and the

claimed comparing the noise level to a predetermined value is met by the threshold measurement and error flag analysis unit 640 (Figs. 11 and 15, col. 13, line 57 to col. 14, line 24).

In considering claim 3, the claimed wherein associating further comprises distinguishing the first portion from the second portion is met by the corrupted data element 680 and the surrounding elements (Fig. 13, col. 15, lines 4-15).

In considering claim 4, Lawlor et al discloses all the claimed subject matter, note 1) the claimed wherein distinguishing further comprises: associating a first value with the first portion is met by the current value (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21), 2) the claimed associating a second value with the second portion is met by the surrounding (adjacent to) elements (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21), and performing a plurality of arithmetic operations between the first value and the second value is met by the interpolation coefficients (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21).

In considering claim 5, the claimed wherein associating a first value with the first portion further comprises: identifying a plurality of values associated with the first portion; and performing an arithmetic operation on the plurality of values to render the first value is met by the current value and the surrounding (adjacent to) elements (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21).

In considering claim 6, the claimed wherein comparing the noise level to the predetermined value comprises comparing the noise level to a noise level found in a second video frame is met by the subtractor 630 determines the numerical difference between a value of data element currently at the input to the

apparatus and the corresponding element which has been delayed by two frames, passing its result to a threshold measurement and error flag analysis unit 640 which compares the current element with the threshold value to determine the corrupted data element (Figs. 10-11 and 15, col. 13, line 16 to col. 14, line 24).

In considering claim 7, the claimed wherein comparing the noise level to a predetermined value comprises associating the predetermined value to the type of the video input signal is met by the threshold measurement and error flag analysis unit 640 which the threshold level is varied according to the spatial frequency range of the sub-band containing the corrupted element (Figs. 11 and 15, col. 13, line 57 to col. 14, line 24).

In considering claim 8, the claimed wherein comparing the noise level to a predetermined value comprises associating the predetermined value to the type of noise in the video frame is met by the threshold measurement and error flag analysis unit 640 which the threshold level is varied according to the spatial frequency range of the sub-band containing the corrupted element (Figs. 11 and 15, col. 13, line 57 to col. 14, line 24).

In considering claim 9, Lawlor et al. discloses all the claimed subject matter, note 1) the claimed a bus is met by the connection between devices of the system 700 (Fig. 14), 2) the claimed a processor coupled to the bus is met by the programmable filter unit 740 which calculates the concealment value 800 (Fig. 14, col. 15, line 16 to col. 16, line 3), 3) the claimed a device coupled to the bus to receive a video signal is met by the delay unit 750 and sample array 720

(Fig. 14, col. 15, line 16 to col. 16, line 3), and 4) the claimed a storage medium coupled to the bus including a software program that, if executed, enables the system to: detect noise in a first portion of a video frame of the video signal, and replace a first portion of the video frame is met by the error flag analyzer 760 which is effectively a look-up table, and in fact is implemented using a programmable read only memory (PROM) (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21 and col. 18, lines 8-13).

In considering claim 10, the claimed wherein the video frame is stored in a memory and, if executed, the software program enable the system to write to the memory to replace the first portion of the video frame is met by the delay unit 750 and sample array 720 (Fig. 14, col. 15, line 16 to col. 17, line 21 and col. 18, lines 8-13).

Claim 11 is rejected for the same reason as discussed in claim 2.

Claims 13-14 are rejected for the same reason as discussed in claims 6-7, respectively.

Claim 16 is rejected for the same reason as discussed in claim 1.

In considering claim 17, the claimed further storing instructions that cause the processor-based system to locate the video frame by reading a memory device is met by the error flag analyzer 760 which is effectively a look-up table, and in fact is implemented using a programmable read only memory (PROM) (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21 and col. 18, lines 8-13).

Claim 18 is rejected for the same reason as discussed in claim 2.

Claims 19-20 are rejected for the same reason as discussed in claims 4-5, respectively.

Claim 21 is rejected for the same reason as discussed in claim 6.

In considering claim 22, the claimed wherein the medium storing instructions is a memory device is met by the error flag analyzer 760 which is effectively a look-up table, and in fact is implemented using a programmable read only memory (PROM) (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21 and col. 18, lines 8-13).

Claims 23-24 are rejected for the same reason as discussed in claims 7-8, respectively.

In considering claim 25, Lawlor et al discloses all the limitations, noted that 1) the claimed receiving a video frame is met by input data element (Fig. 11, col. 13, lines 36-56), 2) the claimed analyzing a first portion of the video frame with a first adjacent portion of the video frame to obtain a first result is met by the current value and the surrounding (adjacent to) elements (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21), 3) the claimed analyzing a second portion of the video frame with a second adjacent portion of the video frame to obtain a second result is met by the current value and the surrounding (adjacent to) elements (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21), and 4) the claimed replacing the first portion of the video frame with one of the second portion, the first adjacent portion or the second adjacent portion if a comparison between the first result and the second result is indicative of noise is met by the spatial replacement which involves replacing a corrupted data element by a single one

of the surrounding elements selected according to a predetermined order of priority (Figs. 13-15, col. 15, line 4 to col. 17, line 21).

In considering claim 26, the claimed wherein each of the first and second portions and the first and second adjacent portions comprises a plurality of units, and wherein the analyzing is performed on a unit by unit basis is met by the current value and the surrounding (adjacent to) elements (Figs. 14 and 15, col. 15, line 16 to col. 17, line 21).

In considering claim 27, the claimed calculating a first threshold based upon an amount of the plurality of units per the respective portion is met by the threshold level (col. 13, line 57 to col. 14, line 24).

In considering claim 28, the claimed wherein the first and second results comprises a sum of absolute differences between the first portion and the first adjacent portion and the second portion and the second adjacent portion, respectively is met by the subtractor 630 determines the numerical difference between a value of data element currently at the input to the apparatus and the corresponding element which has been delayed by two frames, passing its result to a threshold measurement and error flag analysis unit 640 which compares the current element with the threshold value to determine the corrupted data element (Figs. 10-11 and 15, col. 13, line 16 to col. 14, line 24).

In considering claim 29, the claimed wherein the comparison is indicative of noise if a difference between the first result and the second result exceeds the first threshold is met by threshold measurement and error flag analysis unit 640

which compares the current element with the threshold value to determine the corrupted data element (Figs. 10-11 and 15, col. 13, line 16 to col. 14, line 24).

In considering claim 30, the claimed wherein the first portion comprises an edge portion of the video frame is met by the border flag 780 (Fig. 14, col. 15, line 39 to col. 16, line 3).

In considering claim 31, the claimed further comprising encoding the replaced first portion of the video frame is met by the error correction and detection encoding and interleaving unit 110 (Fig. 1, col. 7, lines 9-44).

In considering claim 32, the claimed further comprising replacing a first line of the video frame with a second line of the video frame is met by the frame error concealment (Fig. 11, col. 13, line 36 to col. 14, line 30).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12, 15 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lawlor et al. (US Patent No. 5,353,059).

In considering claim 12, Lawlor et al discloses all the limitations of the instant invention as discussed in claims 9-11 above, except for providing the claimed wherein the predetermined value is stored in the memory. The capability of storing the predetermined value in the memory is old and well known in the art.

Therefore, the Official Notice is taken. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the old and well known of storing the predetermined value in the memory into Lawlor et al's system in order to simply the process of detecting noise in the video signal.

In considering claim 15, Lawlor et al discloses all the limitations of the instant invention as discussed in claim 9 above, except for providing the claimed wherein the storage medium is a hard disk drive. The capability of using storage medium is a hard disk drive is old and well known in the art. Therefore, the Official Notice is taken. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the old and well known of using storage medium is a hard disk drive into Lawlor et al's system in order to reduce the time in access the video signal because hard disk has random access capability.

In considering claim 33, Lawlor et al discloses all the limitations of the instant invention as discussed in claim 1 above, except for providing the claimed wherein the noise results from handling closed caption signals. The capability of detecting noise results from handling closed caption signals is old and well known in the art. Therefore, the Official Notice is taken. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the old and well known of noise results from handling closed caption signals into Lawlor et al's system in order to increase the quality of the video signal by detecting noise results from different sources.

(11) Response to Argument

A. The rejection of claims 1 and 32 over Lawler et al

In re pages 9-10, appellants argue, with respect to claim 1, that Lawlor does not disclose identifying noise in a first portion of a video frame. Lawlor analyzes a video frame by checking for data errors, not noise, e.g., Lawlor, col. 7. These data errors are determined by analysis of error correction codes and, if an error exists, an error flag is set.

In response, the examiner respectfully disagrees. As discussed in the last Office Action, noise is defined in "The IEEE Standard Dictionary of Electrical and Electronics Terms", Sixth Edition, published by the Institute of Electrical and Electronics Engineers, Inc. as "Unwanted disturbances superimposed upon a useful signal, which tend to obscure its information content. Random noise is the part of the noise that is unpredictable, except in a statistical sense."

Lawlor discloses in col. 1, lines 9-14, that "When digital image or video data is recorded or transmitted it can be corrupted by data errors. For example, portions of data recorded on and then replayed from a magnetic medium may suffer errors due to medium defects or dirt particles on the medium's surface". Dirt particles on the medium's surface would introduce "unwanted disturbance superimposed upon a useful signal, which tend to obscure its information content". Thus, the errors of Lawlor can be noise introduced from "dirt particles" on the medium's surface.

Additionally, noise is also defined in "The IEEE Standard Dictionary of Electrical and Electronics Terms", Sixth Edition, published by the Institute of

Electrical and Electronics Engineers, Inc. as "Any deviation between the output signal (converted to input units) and the input signal, except deviations caused by linear time invariant system response (gain and phase shift), a dc level shift, or an error in the sample rate. For example, noise includes the effects of random errors, fixed pattern errors, nonlinearities and time base errors (fixed error in sample time and aperture uncertainty)". Error in Lawlor is deviation between the output signal and the input signal; thus, the error or Lawlor is considered "noise" because it is deviation between the output signal and the input signal.

B. The rejection of claims 2-3 and 6 over Lawler et al

In re pages 10-11, appellants argue, with respect to claim 2, that Lawlor does not disclose associated a noise level with the first portion of a video frame and comparing the noise level to a predetermined value.

In response, the examiner respectfully disagrees. As discussed above with respect to claim 1, since the error of Lawlor is noise, the claim associating a noise level with the first portion of the video frame is anticipated by the three checks for the corrupted data element disclosed in col. 12, lines 44-64 and the claimed comparing the noise level to a predetermined value is anticipated by the threshold measurement and error flag analysis unit 640 disclosed from col. 13, line 57 to col. 14, line 24.

C. the rejection of claims 4 and 5 over Lawler et al

In re page 3, appellants argue, with respect to claim 4, nowhere does Lawlor disclose performing a plurality of arithmetic operations between first and second values associated with first and second portions of a video image.

In response, the examiner respectfully disagrees. The claimed arithmetic operations between first and second values is anticipated by Lawlor's interpolation coefficients disclosed from col. 15, line 16 to col. 17, line 21 because the interpolation coefficients are generated based on current element and the eight surrounding elements.

D. The rejection of claim 7 over Lawler et al

In re pages 11-12, appellants argue that nowhere does Lawlor disclose associating a predetermined value to either the type of video input signal.

In response, the examiner respectfully disagrees. The claimed associating a predetermined value to either the type of video input signal or the type of noise in a video frame is anticipated by the selection of concealment coefficients shown in FIGS. 15A-E because the selection of concealment coefficients is based on the type of noise in a video input signal.

E. The rejection of claim 8 over Lawler et al

In re page 12, appellants argue that nowhere does Lawlor disclose associating a predetermined value to either the type of noise in the video frame.

In response, the examiner respectfully disagrees. The claimed associating a predetermined value to either the type of video input signal or the type of noise in a video frame is anticipated by the selection of concealment coefficients shown in FIGS. 15A-E because the selection of concealment coefficients is based on the type of noise in a video frame.

F. The rejection of claims 9, 10, 16, 17 and 22 over Lawler et al

In re pages 12-13, appellants argue, with respect to claim 9, nowhere does Lawlor disclose a storage medium coupled to a bus that includes a software program that detects noise in a first portion of a video frame and replace the first portion with a second portion of the frame.

In response, the examiner respectfully disagrees. Lawlor discloses in col. 18, lines 8-12 that "Although the embodiment of the invention described above has been implemented predominantly in hardware, it will be clear to the skilled man that the same function could be achieved using suitable software running on a general purpose computer". In order to using software to perform functions of Lawlor, there must be a storage medium for storing the software program. Thus, a storage medium includes a software program that detects noise in a first portion of a video frame and replace the first portion with a second portion of the frame is an inherent characteristic of Lawlor's system.

G. The rejection of claims 11, 13-14, 18, and 21 over Lawler et al

In re page 13, appellants argue that Lawlor does not disclose associated a noise level with the first portion of a video frame and comparing the noise level to a predetermined value.

In response, the examiner respectfully disagrees. As discussed above with respect to claims 1-2, since the error of Lawlor is noise, the claim associating a noise level with the first portion of the video frame is anticipated by the three checks for the corrupted data element disclosed in col. 12, lines 44-64 and the claimed comparing the noise level to a predetermined value is

anticipated by the threshold measurement and error flag analysis unit 640 disclosed from col. 13, line 57 to col. 14, line 24.

H. The rejection of claims 19 and 20 over Lawler et al

In re page 13, appellants argue nowhere does Lawlor disclose performing a plurality of arithmetic operations between first and second values associated with first and second portions of a video image.

In response, the examiner respectfully disagrees. As discussed above with respect to claim 4 above, the claimed arithmetic operations between first and second values is anticipated by Lawlor's interpolation coefficients disclosed from col. 15, line 16 to col. 17, line 21 because the interpolation coefficients are generated based on current element and the eight surrounding elements.

I. The rejection of claim 23 over Lawler et al

In re page 13, appellants argue that nowhere does Lawlor disclose associating a predetermined value to either the type of video input signal.

In response, the examiner respectfully disagrees. As discussed in claim 7 above, the claimed associating a predetermined value to either the type of video input signal or the type of noise in a video frame is anticipated by the selection of concealment coefficients shown in FIGS. 15A-E because the selection of concealment coefficients is based on the type of noise in a video input signal.

J. The rejection of claim 24 over Lawler et al

In re page 14, appellants argue that nowhere does Lawlor disclose associating a predetermined value to either the type of noise in the video frame.

In response, the examiner respectfully disagrees. As discussed in claim 8 above, the claimed associating a predetermined value to either the type of video input signal or the type of noise in a video frame is anticipated by the selection of concealment coefficients shown in FIGS. 15A-E because the selection of concealment coefficients is based on the type of noise in a video frame.

K. The rejection of claims 25 and 30 over Lawler et al

In re page 14, appellants argue, with respect to claim 25, that Lawlor does not disclose analyzing two portions of a video frame with two different adjacent portions to obtain two different results.

In response, the examiner respectfully disagrees. Each FIGS. 15B-15E of Lawlor is a value. Thus, the claimed analyzing two portions of a video frame with two different adjacent portions to obtain two different results is anticipated by at least two of FIGS. 15B-15E of Lawlor.

L. The rejection of claims 26, 27 and 29 over Lawler et al

In re page 15, appellants argue, with respect to claim 26, that nowhere does Lawlor disclose analyzing different portions of a video image where each of the portions comprises a plurality of units and the analyzing is performed on a unit by unit basis.

In response, the examiner respectfully disagrees. As discussed above with respect to claim 25, the selection of the concealment coefficients shown in FIGS. 15A-15E anticipated the claimed analyzing different portions of a video image where each of the portions comprises a plurality of units and the analyzing is performed on a unit by unit basis.

M. The rejection of claim 28 over Lawler et al

In re page 5, appellants argue, with respect to claim 28, that nowhere does Lawlor disclose calculating a sum of absolute differences between two groups of adjacent portions of a video frame.

In response, the examiner respectfully disagrees. As discussed above, the claimed calculating a sum of absolute differences between tow groups of adjacent portions of a video frame is anticipated by the concealment coefficients shown in FIGS. 15A-15E of Lawlor.

N. The rejection of claim 31 over Lawler

In re page 5, appellants argue, with respect to claim 31, that nowhere does Lawlor disclose encoding the replaced first portion of the video frame prior to replacing portions of a video frame.

In response, the examiner respectfully disagrees. It is noted that claim 31 recites "encoding the replaced first portion of the video frame". The claimed limitation of claim 31 is anticipated by frame store 910 of Fig. 16 because the frame store 910 encodes the replaced first portion of the video frame of concealment apparatus 600.

O. The rejection of claims 12 and 15 over Lawler

In re page 16, appellants state that for at least the same reasons discussed above regarding independent claim 9, dependent claims 12 and 15 are patentable over Lawler.

In response, as discussed above with respect to claim 9, Lawler et al teaches all the claimed limitations of claim 9.

P. The rejection of claim 33 over Lawler et al

In re page 16, appellants argue that nowhere does Lawler teach or suggest closed-caption signals nor does Lawler teach or suggest noise resulting from such signals.

In response, the examiner respectfully disagrees. It is agreed that Lawler et al does not disclose the closed-caption signals or noise resulting from such signals, However, as stated in the Final Office Action, that the detection of noise from closed-caption is old and well known in the art and it is considered to be obvious to one of ordinary skill in the art.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

TT TT
June 12, 2004

Conferees

John W. Miller

Victor R. Kostak

TIMOTHY N TROP
PRUNER HU AND MILES PC
8554 KATY FREEWAY STE 100
HOUSTON TX 77024